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ABSTRACT

The concept of attention in sport is important because the inability to process the right kind and amount of information may lead to a mismatch in perception and consequent motor output. Research has shown that the ability to choose between relevant and irrelevant information increases dramatically at about 12 years of age. By giving up the irrelevant information, the processing of relevant information is increased. Styles of selective attention can be described on the basis of width (broad or narrow) and direction (internal or external). For example, in tennis, pregame strategy has a broad internal attention focus, while the execution of a shot has a narrow external focus. Factors relating to attentional capabilities include anxiety level, verbal and mental rehearsal, and reinforcement. Verbal and mental rehearsal can be effective in enhancing attention, especially when combined with reinforcement. (FG)

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A DEVELOPMENTAL PERSPECTIVE OF ATTENTION IN YOUTH SPORT

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An initial step in motor skill acquisition is to identify relevant and irrelevant perceptual factors which will influence eventual motor outcome (Gentile, 1972; Pease, 1977). Consequently, the performer must be able to direct his attention at specific environmental stimuli so that effective and efficient movement output may be facilitated (Stallings, 1976). This concept has been described as selective attention or "the ability to direct our senses and thought process to particular objects, thoughts, or feelings" (Nideffer, 1978, p.163). For example, selective attention could forseeably limit performance if wrong information was attended to. If too much irrelevant information were attended to then a considerable amount of information processing capacity would be utilized and would result in an inability to recognize appropriate information (Singer, 1975; Marteniuk, 1976).

Thus, the limitations imposed by selective attention seem to account for the performance of inexperienced performers for whom too much stimuli is competing for attention. The individual with little or no past experience is handicapped in processing relevant information, while the experienced individual is able to process more of the pertinent information being received by the sensory system (Marteniuk, 1976; Singer, 1968).

The following discussion is designed to provide information regarding attentional styles within given situations and strategies for dealing with attention. In addition, developmental trends in selective attention will be discussed.

Ross (1976) has proposed a three stage model for attention in children: (1) overexclusion, (2) overinclusion and (3) selective attention. Each of the stages represent a different ability in processing information and are representative of different age levels.

The overexclusive stage is indicative of children prior to preschool age, when only one aspect of the environment is attended to in preference to another. Children are unaware of what is going on in the environment.

Very little incidental learning takes place because the child attends only to one aspect of the environment to the exclusion of other aspects. For example, a young child may become so intent on playing with a toy that he does not know anything else that is going on around him. He excludes everything except the toy with which he is playing. Consequently, anything else going on around him goes unnoticed.

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The second stage in the model of attentional development is termed overinclusive. This stage lasts through most of the elementary years. During this stage the child attends to many aspects of the environment, consequently, a great deal of incidental learning occurs. It is important to note that if too much incidental learning is taking up information processing space then too much space is taken up by irrelevant information at the expense of relevant information. For example, a child may be involved in a play situation but cannot attend to his own task because extraneous variables such as other children's behavior or performance is interceding and keeping his performance from its optimum level.

At about the age of 12 years, a transition is seen to a mode of selective attention. A decline in the processing of irrelevant or incidental learning occurs and the child is able to focus on relevant environmental stimuli. Maccoby and Hagen (1965) hypothesize that the ability to selectively attend was a function of increasing age. The development of the ability to select task-relevant (central) information from taks-irrelevant (incidental) information was studied. Results showed that performance on the central task improved with age as did the proportion of central recall to total recall. The results suggest that older children were more efficient in separating relevant-irrelevant information because of a more effective selective filter. Thus, leading to the hypothesis that too much information going into the system causes the efficient learner to ignore task-irrelevant material so that processing of task-relevant stimuli was facilitated.

Smith, Kemler, et al (1975) suggested that developmental differences in both selective attention and strategy use are age-related. Older children were able to use more appropriate focusing strategies. Hagen and Hale (1973) showed that nonselectivity was due to an inability to select between messages rather than an inability in the perception of the message itself. Therefore, as selective attention improved, increasingly higher central recall was observed and lower incidental recall.

Consequently, a trade-off was seen between central and incidental recall. Hagen and Sabo (1967) showed that changes in attentional styles were not particular to the age but possibly were the beginning of a more efficient stage in processing information. The findings suggest that young children take in information from the environment indiscriminately, therefore, not focusing selectively. These findings support Maccoby and Hagen (1965) indicating that more efficient information processing occured with increasing age (Hagen and Sabo, 1967).

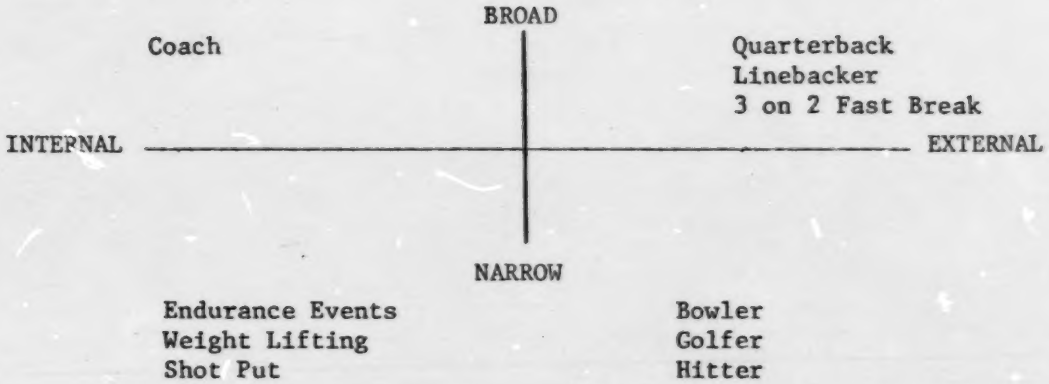
In Ross' (1976) model it is interesting to note that the difference between the modes of attention is the separation of relevant versus irrelevant information (Stratton, 1978). This is of significance developmentally and also an important concept in sport. From the aforementioned findings it is safe to say that when an inability exists in separating relevant from irrelevant stimuli, then a deficit exists in the processing of stimuli and a subsequent mismatch in perception and motor output.

The developmental phases of selective attention are of particular relevance to the coach of youth sport. Take for example the basketball player who steps up to the free throw line to make a crucial shot. If his attention is distracted by the crowd noise or the people waving their hands behind the backboard then the shot may be affected by these diversions. However, if the player can narrow his focus to only the basket then more efficient performance may be seen. In an effort to understand what was happening in this example let's look at attentional focus and the work of Nideffer.

Nideffer (1976) has described attention on the basis of a continuum of width and direction. Consequently, one might think of attentional style as having width (broad or narrow) or direction (internal or external). In a given situation one may change his position along the continuum as environmental variables dictate. Quite often even within a given situation a shift in attentional style is necessary where an external focus may be better than a stictly internal focus. Consequently, the individual must learn to control his attentional focus even within given situations.

Before going into Nideffer's model perhaps the concept of open versus closed skills should be reemphasized. Germane to the discussion on attention is the concept of closed versus open skills and the differentiation between skills that are mainly motor oriented and those tasks that are dependent upon perceptual information (Knapp, 1961). Closed skills are those which place little dependence upon environmental information and greater importance upon a consistently replicable movement or stationary environmental conditions (Drowatsky, 1975; Poulton, 1957). Open skills, on the contrary, are exemplified by continued alteration of the movement due to changing environmental input (Drowatsky, 1975; Poulton, 1957). Examples of open skills include activities such as a jump shot in basketball, a tennis overhead, and a fly pattern in football, whereas closed skills would be characterized by hitting a golf ball, bowling and archery. Note should be made that no skill is defined as purely open or closed but that many activities may contain components of each. The initial step in skill acquisition for open and closed skill is similar in that the performer must selectively attend to the conditions in order to organize a movement match with the environment (Gentile, 1972).

Nideffer (1976) has conceptualized a schematic diagram on attentional focus which elucidates the attentional styles with various examples of closed or open skills.



The width continuum extends from BROAD to NARROW which indicates one's ability to reduce the breadth of focus and/or broaden one's attentional focus. The horizontal line or the directional continuum deals with one's focus from extremely internal to extremely external.

Nideffer (1976) suggests that most people fall somewhere along the continuum and attempt to maintain a balance between both width and direction. Consequently, in a given situation a person may be considered to have a broad-internal or narrow-external focus depending upon the environmental variables. Therefore, as a given situation arises it is necessary for an individual to be able to alter his attentional focus. For example even though a sport may be a predominately closed skill, situations may arise when the athlete must have a broad-external focus.

Let's look back at Nideffer's (1976) diagram and the examples of attentional focus that are given. The quadrant termed broad-internal focus is very valuable when an individual needs to consider a variety of variables and ponder the outcome. This behavior might be characteristic of a coach prior to a game.

A broad-external focus is necessary when a response is needed in rapidly changing circumstances when complexity is involved. For example, what happens to the quarterback when his receiver is covered and he doesn't want to be thrown for a loss? Time is of the essence and changing the intial plan is important.

The third quadrant is termed narrow-external and is irdicative of a situation where there are only a few cues and the motor act can run off in a prescribed manner once it has begun. An example of this is the golf swing. A few external variables are present but once the swing (motor act) is initiated it is automatic.

The last attentional focus is narrow-internal in nature. This type of focus is evident when no environmental changes are rapidly occurring and no rapid response is necessary, therefore, the act itself becomes hypnotic. Examples of this attentional style are endurance events.

The following table presents some of the more common competitive situations and the dominant attentional style necessary (Nideffer, 1976, pp. 62-63).

ATTENTIONAL DEMANDS OF VARIOUS COMPETITIVE SITUATIONS

	Broad External	Narrow Internal	Narrow External	Broad Internal
Golf				
1. Club selection	Yes	Yes		
2. Execution of the shot			Yes	
Gymnastics				
1. Planning a routine				Yes
2. Execution		Yes	Yes	
Swimming				
1. Sprints			Yes	
2. Middle distance events		Yes	Yes	
3. Distance events		Yes	Yes	
Coaching				
1. Development of basics			Yes	
2. Development of a game plan				Yes
3. Awareness of players relative to strengths and weaknesses	Yes			Yes
4. Ability to anticipate players' responses to instructions, praise, punishment, etc.			Yes	Yes
Tennis				
1. Pre-game strategy				Yes
2. Execution of shot			Yes	

To reemphasize the necessity of changing attentional focus, Nideffer (1976) cites the example of a pitcher with a runner on base. The pitcher must remember to look back at the base as well as attend to the catcher and batter and the position of the outfield. This example illustrates the necessity of the pitcher being able to attend to several relevant cues but then able to narrow his focus to ultimately pitch the ball. The pitcher must be able to selectively attend to various cues and not be distracted by irrelevant information.

Nidefer (1976) has developed a test to describe an individual's attentional capabilities (Test of Attentional and Interpersonal Style, Nideffer, 1976). By utilizing the results of the test one may begin to gain control over behavior in a given situation and effectively use the information as a strategy for working on reducing or tuning out distracting external stimuli. By taking a simple paper-pencil test information can be gleaned as to how an athlete functioned in the past. Later, strategies for improvement or deficits will be suggested.

Attention may be affected by one's anxiety level. Various cognitive strategies (i.e. biofeedback, mental rehearsal) may assist in fostering attentional behaviors in order to overcome the effects of anxiety. By taking the wealth of information from sport psychology and motor learning, and applying it, the coach can assist individuals or athletes in improving their performance. This section will focus on strategies presently in your repertoire for developing attending behaviors in your students and/or athletes.

Gallwey (1976) in his book Inner Tennis has listed practical techniques for improving tennis ability. One familiar technique is the bounce-hit drill. Basically, it is a tool for fostering attending behaviors which calm the mind so that one can hit the tennis ball. It accomplishes the task of focusing the attention on something tangible--the ball. Numerous other examples are suggested such as the Mark The Spot Drill, Looking at the seams on the ball, etc.

The use of verbal rehearsal leads to individuals learning to use strategies already in their repertoire and/or learning to better use strategies minimally developed. Tarver, Hallahan, Kauffman and Ball (1976) studied the development of verbal rehearsal strategy and selective attention. Verbal rehearsal was shown to facilitate selective attention performance. Therefore, the processes associated with the acquisition and retention of information prove to be very important.

Mental rehearsal may aid athletes in their attentional style as mental rehearsal serves to help athletes discriminate between relevant and irrelevant cues (Nideffer, 1980). The athletes can be taught to narrow his focus to more effective levels.

A study by Dawson, Hallahan, Reeve, and Ball (1978) showed a direct comparison of reinforcement and verbal rehearsal. Results showed that verbal rehearsal was more effective than reinforcement but verbal rehearsal combined with reinforcement was most effective. Reinforcement by itself was least effective in that more incidental learning occurred in this situation than in verbal rehearsal.

Therefore, the strategy condition proved superior to reinforcement. Consequently, selective attention has been found to improve through the use of reinforcement. Performance was observed in a task requiring attention to cues of differential reinforcement values, thus suggestive of reinforcement having a facilitative effect on selective attention (Hagan and West, 1970).

A study by Hallahan, et al (1978) compared selective attention performance under reinforcement, response cost and a standard condition. Results indicated reinforcement (not response cost) was effective in increasing the recall of high pay-off stimuli relative to low pay-off stimuli. This suggested that a high degree of pay-off for attending to one stimulus category over another provided impetus for activation of rehearsal strategy (Hallahan, Tarver, Kauffman and Graybeal, 1978).

The following conclusions appropriately sum up points made in this paper:

1. Children develop the ability to attend to relevant stimuli in the face of irrelevant stimuli with a dramatic increase in this ability in the normal child at about 12 to 13 years of age.

2. The processing of relevant and irrelevant information are reciprocal processes, such that giving up the processing of irrelevant information is accompanied by increased processing of relevant information.

3. One of the primary reasons for doing poorly on tasks requiring selective attention or changing one's attentional focus is that deficits in strategy use are present.

4. The deficiency in the use of verbal rehearsal strategies can be overcome by specific training in these skills (Hallahan and Reeve, in press, pp. 2-3).

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